



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,500	06/19/2003	Frank Y.H. Fan	KLA1P118/P1062	6747
22434	7590	06/08/2004	EXAMINER	
BEYER WEAVER & THOMAS LLP			STEVENSON, ANDRE C	
P.O. BOX 778			ART UNIT	
BERKELEY, CA 94704-0778			PAPER NUMBER	
			2812	

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/600,500	Applicant(s) FAN, FRANK Y.H.	
	Examiner Andre' C. Stevenson	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
 2. ☐ received in Application No. (Series Code / Serial Number) _____.
 3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 16 through 19 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper filed on January 20, 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims **1 through 9 and 12 and 15**, are rejected under 35 U.S.C. 102(a) as being unpatentable over McCord (U.S. Pat. No.6627884 B2).

McCord (U.S. Pat. No.6627884 B2), for **Claim #1**, a method for reviewing voltage contrast defects on a semiconductor specimen comprising: turning on an electron flood gun; applying a surface charge to a semiconductor specimen by using the flood gun; turning off the electron flood gun (**Column 1, lines 58 through 67, Column 2, lines 1 through 15, Column 4, lines 15 through 46**); using an electron beam generator to direct an electron beam upon the surface of the specimen, wherein the electron beam causes secondary electrons to emanate from the specimen; detecting the secondary

Art Unit: 2812

electrons in order to locate voltage contrast defects; and reviewing the located voltage contrast defects, (Column 19, lines 25 through 49). (**Column 5, lines 1 through 33, Column 1, lines 22 through 33, Column 2, lines 16 through 23, Column 3, lines 51 through 67**)

With respect to **Claim #2**, a method as recited in claim 1 wherein the surface charge is applied to the entire surface of the specimen, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

Furthermore, **Claim #3**, a method as recited in claim 1 wherein the surface has a negative or positive charge, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

With respect to **Claim #4**, a method as recited in claim 1 wherein the operations of claim 1 are repeated such that during each iteration, voltage contrast defects in a new sub-region are detected and reviewed, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33, Column 1, lines 22 through 33, Column 2, lines 16 through 23, Column 3, lines 51 through 67, Column 1, lines 58 through 67, Column 2, lines 1 through 15, Column 4, lines 15 through 46).

Considering now **Claim #5**, a method as recited in claim 1 further comprising:
reapplying a surface charge to the semiconductor specimen using the flood gun when the charge on the specimen is determined to be insufficient for voltage contrast effects to manifest, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33, Column 1, lines 22 through 33, Column 2, lines 16 through 23, Column 3, lines 51 through 67, Column 1, lines 58 through 67, Column 2, lines 1 through 15, Column 4, lines 15 through 46).

Furthermore, **Claim #6**, a method as recited in claim 1 further comprising:
positioning a specimen charge electrode above the semiconductor specimen; and while the flood gun is turned on, biasing the specimen charge electrode at a certain voltage level in order to obtain a desired charge amount on the semiconductor specimen, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

With respect to **Claim #7**, a method as recited in claim 6 wherein the specimen charge electrode is negatively biased whereby a negative charge is applied to the semiconductor specimen, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

Considering now **Claim #8**, a method as recited in claim 6 wherein the specimen charge electrode is positively biased whereby a positive charge is applied to the

semiconductor specimen, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

Furthermore, **Claim #9**, a method as recited in claim 1 further comprising:
supporting the semiconductor specimen with a specimen stage, wherein the semiconductor specimen and the specimen stage are in electrical contact; and biasing the specimen stage at a certain voltage level in order to obtain a desired surface charge amount on the semiconductor specimen, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 4, lines 47 through 67).

With respect to **Claim #12**, a method as recited in claim 1 wherein the operation of reviewing the located voltage contrast defect involves energy dispersive x-ray analysis techniques or cross sectioning tools, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 2, lines 56 through 67, Column 3, lines 5 through 28, Column 4, lines 26 through 43, Column 12, lines 16 through 30, Column 19, lines 25 through 49).

With respect to **Claim #15**, a method as recited in claim 1 wherein a scanning electron microscope inspection system is used for review, is taught by McCord (U.S. Pat. No.6627884 B2), (Column 5, lines 1 through 33).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim **10** and **11**, is rejected under 35 U.S.C. 103(a) as being unpatentable over McCord (U.S. Pat. No.6627884 B2) as applied to claims **1 through 9 and 12 and 15** above, and further in view of Lo et al (U.S. Pat. No.6566897).

McCord (U.S. Pat. No.6627884 B2) discloses the claimed invention except for wherein specimen stage is positively biased whereby a negative charge is applied to the semiconductor specimen. Lo et al (U.S. Pat. No.6566897) teaches that it is known to have wherein specimen stage is positively biased whereby a negative charge is applied to the semiconductor specimen.

Considering now **Claim #10**, a method as recited in claim 9 wherein the specimen stage is positively biased whereby a negative charge is applied to the

Art Unit: 2812

semiconductor specimen, is taught by Lo et al (U.S. Pat. No.6566897), (Column 7, lines 14 through 30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a specimen stage being positively biased whereby a negative charge is applied to the semiconductor specimen, as taught by Lo et al (U.S. Pat. No.6566897), since Lo et al (U.S. Pat. No.6566897) states at Column 7, lines 14 through 30 that such system would allow one to vary independently the beam landing energy at the surface.

Furthermore, **Claim #11**, a method as recited in claim 9 wherein the specimen stage is negatively biased whereby a positive charge is applied to the semiconductor specimen, is taught by Lo et al (U.S. Pat. No.6566897), (Column 7, lines 14 through 30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to

a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim **14** is rejected under 35 U.S.C. 103(a) as being unpatentable over McCord (U.S. Pat. No.6627884 B2) as applied to claims **1 through 9 and 12 and 15** above, and further in view of Lo et al (U.S. Pat. No.6232787).

McCord (U.S. Pat. No.6627884 B2) discloses the claimed invention except for detecting voltage contrast defects within features on the semiconductor specimen that have high aspect ratios. Lo et al (U.S. Pat. No.6232787) teaches that it is known to detect voltage contrast defects within features on the semiconductor specimen that have high aspect ratios.

Furthermore, **Claim #14**, a method as recited in claim 13 further comprising: detecting voltage contrast defects within features on the semiconductor specimen that have high aspect ratios, is taught by Lo et al (U.S. Pat. No.6232787), (Column 7, lines 49 through 67, Column 8, lines 1 through 49).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to detect voltage contrast defects within features on the semiconductor specimen that have high aspect ratios, as taught by Lo et al (U.S. Pat. No.6232787), since Lo et al (U.S. Pat. No.6232787) states at Column 7, lines 49

through 67, Column 8, lines 1 through 49, would allow for high beam current for greater throughput.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim **#13** is rejected under 35 U.S.C. 103(a) as being unpatentable over McCord (U.S. Pat. No.6627884 B2) as applied to claims **1 through 9 and 12 and 15** above, and further in view of K. Nakamae, H. Tanimoto, T. Takase, H. Fujioka and K. Ura. [Journal of Physics D-Applied physics, 1992, V25, N12, (December 14), pg. 1681 – 1686.]

McCord (U.S. Pat. No.6627884 B2) discloses the claimed invention except for electron beam generator producing an electron beam having a current level approximately within the range of 10-50 pico Amps. K. Nakamae, H. Tanimoto, T. Takase, H. Fujioka and K. Ura. [Journal of Physics D-Applied physics, 1992, V25, N12, (December 14), pg. 1681 – 1686.] teaches that it is known to have an electron beam

Art Unit: 2812

generator producing an electron beam having a current level approximately within the range of 10-50 pico Amps.

Considering now **Claim #13**, a method as recited in claim 1 wherein the electron beam generator produces an electron beam having a current level approximately within the range of 10-50 pico Amps, is taught by K. Nakamae, H. Tanimoto, T. Takase, H. Fujioka and K. Ura. [Journal of Physics D-Applied physics, 1992, V25, N12, (December 14), pg. 1681 – 1686.], (Abstract)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have electron beam generator producing an electron beam having a current level approximately within the range of 10-50 pico Amps, as taught by K. Nakamae, H. Tanimoto, T. Takase, H. Fujioka and K. Ura. [Journal of Physics D-Applied physics, 1992, V25, N12, (December 14), pg. 1681 – 1686.], since K. Nakamae, H. Tanimoto, T. Takase, H. Fujioka and K. Ura. [Journal of Physics D-Applied physics, 1992, V25, N12, (December 14), pg. 1681 – 1686] states would assisted the high aspect ratio.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre' Stevenson whose telephone number is (571) 272

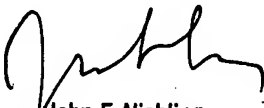
Art Unit: 2812

1683. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (571) 272 1679. The fax phone number for the organization where this application or proceeding is assigned is (703) 308 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956. Also, the proceeding numbers can be used to fax information through the Right Fax system;

- (703) 872 9306


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800

Andre' Stevenson

Art Unit 2812

02/20/04